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LABORATORY SELECTION FOR POLLUTANT SOURCE IDENTIFICATION STUDY
FOR THE U.S. DEPARTMENT OF JUSTICE AND THE U.S. ENVIRONMENTAL
PROTECTION AGENCY: CAPABILITIES AND ADVANTAGES OF CAPSULE
LABORATORIES.

Introduction.

The U.S. Department of Justice and the U.S. Environmental Protection Agency are currently pursuing litigation against the Reilly Tar and Chemical Company whose activities have resulted in the disposal, leaching, and migration of hazardous and other chemical wastes into the ground and waters in and around the City of St. Louis Park, Minnesota.

Laboratory studies undertaken to date have determined the chemical nature of only relatively few of the pollutant chemicals and have provided a general indication of the extent of the contamination. Unfortunately, however, considerable diversity of sampling and analytical methods were used by the various laboratories conducting these projects and this has resulted in an extensive but uncorrelated data base that is not specific enough for litigation purposes. Also, expert review of the more comprehensive of the analytical studies has shown that in some cases the analytical method that was selected did not provide the degree of specificity that would be necessary to make the identification claimed, and in other cases, the data interpretations were not adequate to justify the identifications. Coupled with the sampling variations, these problems have generated data that do not provide definitive information that would be sufficient to demonstrate under litigation circumstances that the pollutants found in the ground and water samples do, in fact, derive from the Reilly Tar site and not from natural or other anthropogenic sources.

In order to demonstrate this specific connection for litigation purposes, the U.S. Department of Justice and the Office of Waste Programs Enforcement of the EPA need a pollutant source identification study involving the collection of samples from specially selected sites and the analysis of these samples by rigorous and defensible methodologies. In view of the key nature of this analytical study to the other aspects of the litigation -- namely, the present and future adverse health effects of the pollutant chemicals, and the measures that will be taken to remedy the situation -- it is imperative that this study be undertaken with the utmost scientific integrity that as far as possible will ensure the success of the impending litigation. The study, therefore, does not represent the usual type of sampling and testing project commonly undertaken for environmental assessment purposes, and the selection of the laboratory that will successfully accomplish this study must be made with considerable care and with due regard for the legal use of the scientific data that will be generated.

Specific Capabilities of Capsule Laboratories.

An extensive effort has already been made to select a laboratory that can perform this study, and only one facility, Capsule Laboratories of St. Paul, Minnesota, is considered to have the necessary degree of scientific expertise, experience and capabilities to perform this study in a scientifically and legally defensible way and in a timely and cost-effective manner.

The key area that must be addressed in this scientific study is the acquisition of samples that are suitable, both qualitatively and quantitatively, for the designated analytical purpose and which represent as far as possible the nature of the material as it occurs in the environment. In this study, the analytical procedures that need to be undertaken are significantly different from standardized methodologies (as used for Priority Pollutant analyses, for example) in that it is necessary to identify as many as possible of all of the organic constituents of each sample, and then subsequently to provide at least a semi-quantitative assessment of the absolute and relative amounts of these organic species. This approach requires that the instrumentation used for the final analysis be operated in such a way as to acquire any and all data as it may arise, as it is not known ahead of time which chemicals are present in the sample.

The nature of the analysis compiled with the very low contaminant concentrations demand that relatively large samples be made available for analysis, and it is apparent from review of previous studies of the environment around the Reilly Tar site, that the lack of suitable samples has been one of the serious obstacles to providing the necessary scientific data.

Capsule Laboratories has already expended considerable time on this problem and has developed a unique proprietary sampling system which utilizes state-of-the-art techniques not found in the usual commercial testing laboratory. This sampling system has been evaluated by one of our scientific experts who has verified that the methodology is sound, that appropriate validation studies have been performed, and that the results of these validation studies are satisfactory.

Several features of Capsule's sampling system should be specifically described to describe their unique capabilities. Firstly, the method removes the organic constituents in the water samples at the sampling location so that it is not necessary to transport large volumes of water away from the sampling site for analysis. Transportation of large water samples is inherently problematic, not just because of handling logistics, but also because bacterial and/or photochemical activity can continue in the water during transportation and these processes can degrade or change the organic species that were originally present.

Secondly, the sampling method used by Capsule Laboratories actually acts not just as a method for obtaining a sample, but also as the first stage of the analytical process, namely the removal and concentration of the organic species away from the water. Thus, the sampling and analytical aspects of the study are inextricably intertwined and must be undertaken by a single laboratory -- a situation that in any case is highly desirable in any trace organic study.

Capsule Laboratories not only has already completed all but one of the necessary validation and QA/QC studies for their sampling system, but these studies were done on actual samples obtained from the Reilly Tar problem area, and thus this information provides Capsule Laboratories with a considerable background of expertise with these same samples. In fact, Capsule Laboratories currently has their sampling system installed in at least one (and possibly as many as three) of the wells that will finally be sampled for the Pollutant Source Identification Study, and it should also be noted that these sampling systems would have to be removed by Capsule Laboratories personnel prior to any installation of similar equipment that might be developed by another laboratory. Also, under another contract, Capsule Laboratories has acquired considerable sampling and analytical experience with a variety of city wells in the Reilly Tar area and this experience could be utilized in selecting wells to provide control samples for this study.

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In addition, after the remaining scale-up experiment is completed, Capsule's sampling system can be easily adapted to acquire any desired quantity of organic material for any purpose -- such as short-term biological testing for toxicity or mutagenicity (as is required in this study), or for monitoring the effects of future remedial action on and around the Reilly Tar site.

It should also be noted that the U.S. Department of Justice has indicated that as the evidence in the trial will be presented in the State of Minnesota, then the use of a local laboratory for this litigation and might add considerable credibility in the trial situation.

Summary

In view of the unique questions that must be answered for this litigation, the selection of Capsule Laboratories to successfully carry out the Pollutant Source Identification Study is of crucial importance. The key criteria which must be considered are:

- a) sample collection, which requires a large-volume field sampler capable of producing validated representative samples for qualitative and quantitative chemical analysis and for short-term bioassays;
- b) sample preparation, which requires trained personnel with meticulous laboratory skills, experienced laboratory managers, and a clean, well-organized facility to permit the successful accomplishment of such trace organic analyses;
- c) sample analysis, which requires state-of-the-art instrumentation with computer support, and qualified scientific personnel; and
- d) expert data interpretation and carefully-controlled study management and supervision.

The successful completion of these aspects of the Pollutant Source Identification Study can best be accomplished in a timely and cost-effective fashion by Capsule Laboratories who have unique capabilities to provide the rigorous and legally-defensible data that is required for this litigation.

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that will meet the deadlines imposed by target court date of November, 1983.

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The nature of the analysis compiled with the very low contaminant concentrations demand that relatively large samples be made available for analysis, and it is apparent from review of previous studies of the environment around the Reilly Tar site, that the lack of suitable samples ^{site} has been one of the serious obstacles to providing the necessary scientific data.

in its work with the City of St. Paul, Minn.

The methodology is planned for publication by Jan 1983.

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*Donna Frost?
Brenda Kille*

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Transportation of large water samples is inherently problematic, not just because of handling logistics, but also because bacterial and/or photochemical activity can continue in the water during transportation and these processes can degrade or change the organic species that were originally present. *Since the samples will*

contain very small amounts of contamination, any photodegradation or biodegradation of the organics will significantly change the ~~for~~ levels of organic constituents in the sample and thus adversely affect the perceived impact to the public health and environment.

Secondly, the sampling method used by Capsule Laboratories actually acts not just as a method for obtaining a sample, but also as the first stage of the analytical process, namely the removal and concentration of the organic species away from the water. Thus, the sampling and analytical aspects of the study are inextricably intertwined and must be undertaken by a single laboratory -- a situation that in any case is highly desirable in any trace organic study. *decreases the normal error due to sampling procedures and analytical technique.*

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proposed for funding

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how?

→ ... In that procedures and analytical techniques can be conveniently reproduced and witnessed by the court if necessary.

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